Pioneer TV/FM Tuner card with Dual HDMI

TVP-500F
Installation Manual

Manual# 050523
Model: TVP-500F

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1 Introduction

The TVP-500F is a high quality TV Tuner/Scaler with dual HDMI. It supports advanced functionality, like video format /scan rate conversions, audio effects, Closed Caption decoding, V-Chip, Sleep Timer, and more. In addition the TVP-500F has a FM tuner with RDS capability and station information which is displayed on the plasma. The TVP-500F also expands on the displays capabilities with its own internal menu systems and advanced features.

2 Accessories

The accessories supplied are:

- IR Remote (IRC-10)

All supplied components are shown on the picture below:

3 Quick Start Guide

1. Make sure the Pioneer Display is off (no LED) and disconnected from the power.
2. Remove the blank plate covering the expansion slot or if an existing card is present, it must be removed from the slot.
3. Carefully insert the card into the slot and tighten the spring loaded screws.
4. Connect the appropriate video sources to input connectors of TVP-500F (see "Connections" on page 4 for details).
5. Connect the power source to the display (refer to Operating Instructions of the Display).
6. Turn on the display with the power button on the display remote.

Warning: Please keep in mind static images can lead to image burn in on some displays. Never leave a still image on a phosphor based screen for long periods of time unless the intensity of the display is turned down. Refer to your operations manual for you display device to assure proper functionality.

4 Pioneer Display Settings

Initial settings on the first use of TVP-500F:

Main Menu → Set Up:

- Color Decoding: RGB
- Clamp position: Locked
- Signal Format: 525P

Note: Inputs 3 and 4 have Color Decoding only.

Integrator Menu → Option:

- Baud Rate: 9600

To get into Integrator Menu, press and hold Display key on the display remote for approximately 5 seconds. Then press Menu key on the display remote. This will bring up the Integrator Menu.

It may be necessary to adjust picture size and position for best picture alignment using Screen adjustment from the display Menu and from Video Position on TVP-500F Menu (page 9).

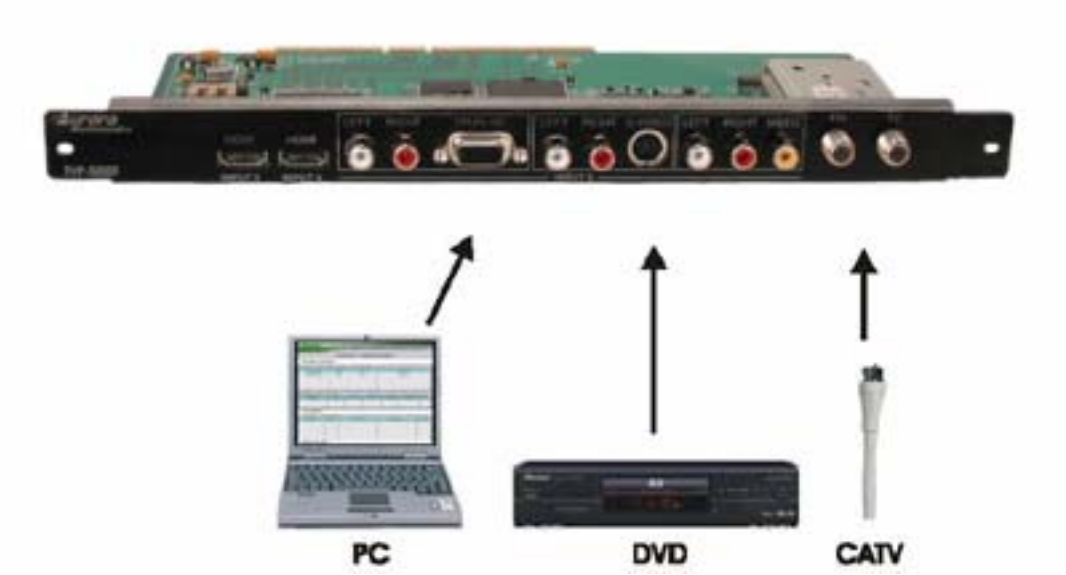
Plasma Displays often "overscan" the image slightly; in some cases when displaying a channel, there may be a narrow black bar on the left/right or top/bottom of the screen. Use the utilities mentioned above to "overscan" the picture as necessary to ensure that picture is filled the entire screen for all channels and signal inputs.

5 Connections

5.1 A/V connectors

- Composite Video input
- S Video input
- RGB/YPbPr input
- 2 HDMI inputs
- Audio inputs for Video, S Video, and RGB/YPbPr

Example of interconnections for a display device, TVP-500F, DVD/VCR (or other source of video), and TV antenna or cable is shown below. Note that standard RCA cables for audio and video connections, standard S-Video cable, or RF antenna cables are not supplied with the TVP-500F.



5.2 RF connector

The coaxial connector (ANT) of TVP-500F is RF signal input – either aerial or cable TV, UHF/VHF, if the TVP-500F shall be used as TV tuner. The other is for FM antenna reception.

6 Supported IR transmitter(s) and basic key functions

The TVP-500F is controlled using an IR remote controller. It utilizes IR receiver of the display via the built in IR sensor of the display.

The TVP-500F unit is compatible with the Aurora IRC-10 remote transmitter(s) below (see Fig.1).

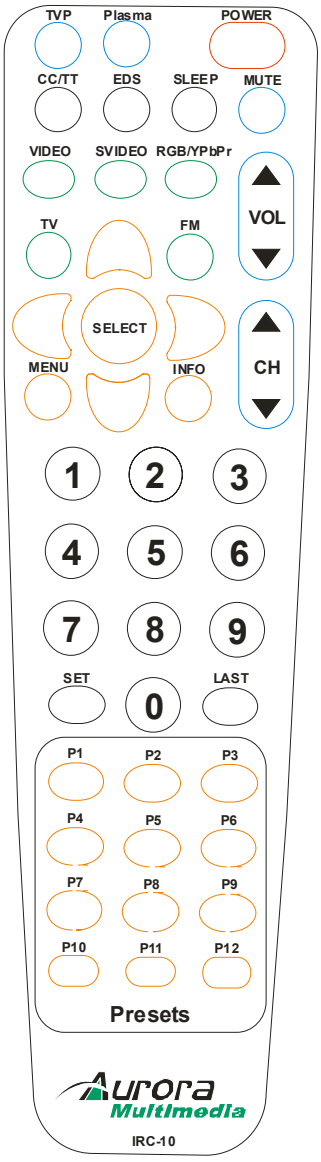


Fig. 1

For details of the TVP-500F operation refer to the corresponding chapter of this document. Below is a brief description of the remote transmitter and the keys used for control of the TVP-500F.

IR Remote	*Function*
TVP	Selects to control the TVP-500F functions
PLASMA	Selects to control functions specific to the plasma
POWER	Toggles Power on/off
CC/TT	Enables/Disables Closed Captioning or Teletext (if available)
EDS	Enables/Disables Extended Data Service (if available)
SLEEP	Sets Sleep Timer
TV INPUT	Selects TV Antenna as source
FM INPUT	Selects FM Antenna as source
VIDEO INPUT	Selects Composite Video as source
S-VIDEO INPUT	Selects S-Video as source
RGB/YPbPr INPUT	Selects RGB or YPbPr as source
CHANNEL+/-	Changes TV channel or FM frequency up/down
VOLUME +/-	Adjusts volume level up/down
MUTE	Toggles the volume mute on/off
ARROWS	Moves the cursor up/down, selects or changes contents when Menu is active.
MENU	Displays the menu and exists from the menus
SELECT	Selects option in menu Sets contents or changes in dialog panels
INFO	Displays current channel, input and output formats
SET	Pressing this and one of the Preset buttons within 1.5 seconds will store the current channel (TV) or station (FM)
LAST	Return to the last saved channel
PRESET KEYS	P1 – P12: Selects the stored preset for TV or FM P1 – Also used as Red for Teletext P4 – Also used as Green for Teletext P7 – Also used as Yellow for Teletext P10 – Also used as Blue for Teletext
0..9, DIGITS	Directly enters channel number (TV) or FM frequency (FM) to switch to. It is also used to enter the page numbers for Teletext.

7 Operating the TVP-500F

Input Select:

Inputs 3, 4, and 5 of the display are reserved for TVP-500F if this card is installed. Below are signal assignments for each input:

- Input 3: HDMI A
- Input 4: HDMI B
- Input 5: TV/FM, Composite Video, S Video, and RGBHV / YPbPr.

Both Pioneer and Aurora remotes (IRC-10) can be used to switch inputs.
Switching input using Pioneer remote:

- Press number 3 or 4 to switch to HDMI A or HDMI B respectively.
- Press number 5 to switch to TV/FM, Video, S Video, or RGB/YPbPr.

Switching inputs using Aurora remote:

- Press Plasma, then 3 or 4 to switch to HDMI A or HDMI B respectively.
- Press Plasma, then 5 to switch to TV/FM, Video, S Video, or RGB/YPbPr.
-

Since input 5 of the display is used to display different input signals from TVP-500F, these input signals (Video, S Video, and RGB/YPbPr) can be selected using Aurora remote (the green buttons). Switching between TV and FM can be done by using TV and FM buttons. Make certain to press TVP button first to control the TVP-500F functions.

Note: RGB and YPbPr inputs share the same connection (VGA) and only one source can be connected at a time. Pressing RGB / YPbPr button will toggle between RGB and YPbPr inputs. The last input signal will be saved when changing to a different input and when this button is pressed again, the last saved input will be selected.

7.1 Remote Control Functions

When no menu is active, usual keys of IR transmitter can be utilized to change volume level and switch channels. These control keys are:

Key: Volume+/- ("VOL")

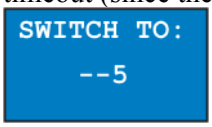
Adjusts the plasmas volume up and down when plasma mode is selected on the top of the remote.

Key: Channel +/- ("CH")

Changes TV channel (TV mode) or change FM frequency (FM mode). Number and label (if was defined) of the new channel or FM station is shown at top of screen for 5 seconds.

Keys: 0-9

Dialog: “SWITCH TO” or “NEW FM FREQUENCY” – enter new channel number or FM frequency, several digits can be entered if necessary. Channel or FM frequency is switched to after a 3 seconds timeout (since the most recent digit is entered) or after pressing Select button.



Key: Menu

Display the main menu. See the Menu Structure chapter.

Key: Select

Enter selections for the menu.

Key: Power

Switch plasma power on or off when the plasma mode on top of the remote is selected.

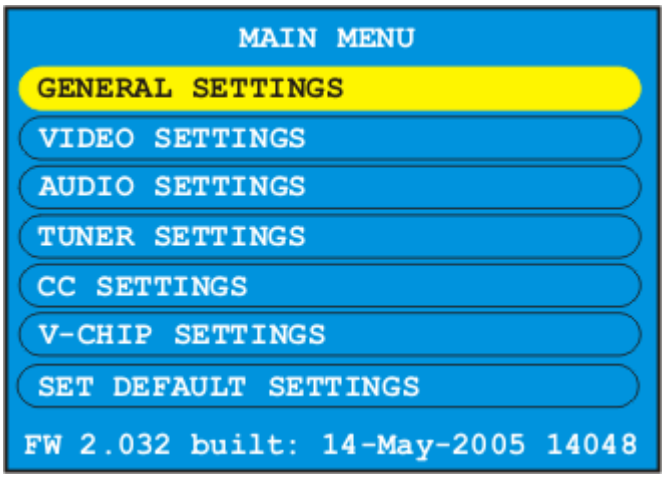
7.2 Menu Structure

The menu structure allows controllability of various aspects of TVP-500F configuration.

For all menus, Up/Down arrows move the cursor (yellow “selection” highlight) up/down. Select button will select the current submenu/option and finishes text entry (passwords, channel labels, etc.). Left/right arrows change the currently active option, if possible.

When in “text edit” dialog (e.g., channel label editing), left/right arrows move the cursor left/right, up/down arrows change the character at the cursor.

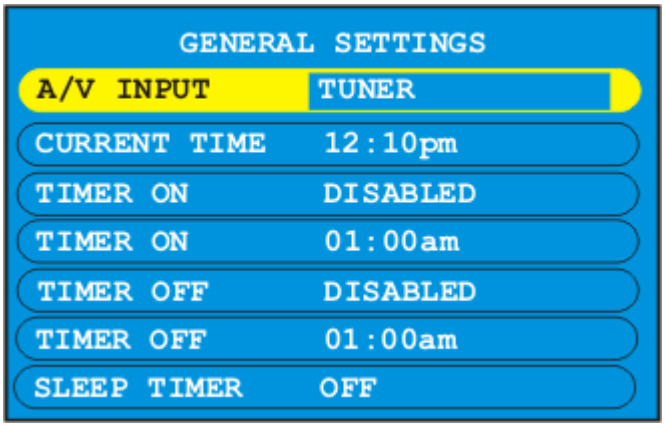
7.3 Main Menu:



The Main Menu displays all sub-menus that will be discussed in more detail in the subsequent chapters.

Note: when existing from the Main Menu, a 3 to 5 seconds delay is needed before the next IR command (from the remote) is sent out.

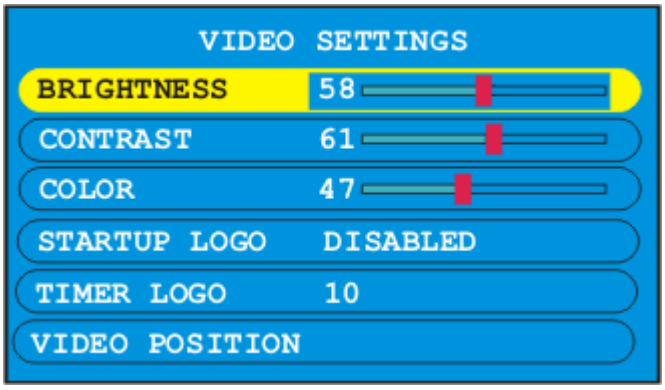
7.4 General Settings



This menu allows control of various "general" aspects of TVP-500F behavior.

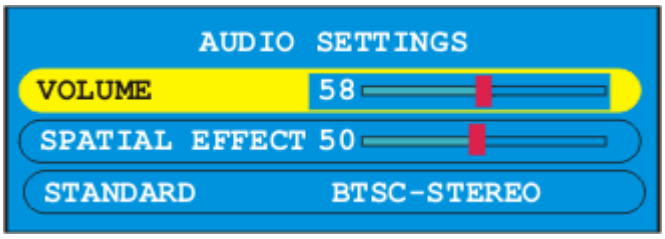
A/V Input – Selects input signals for input 5 of the plasma.
Current time – Sets the current time.
Timer On – Sets the turn on time of the plasma and allows it to be enabled and disabled.
Timer Off – Sets the turn off time of the plasma and allows it to be enabled and disabled.
Sleep timer – Sets sleep timer.

7.5 Video Settings



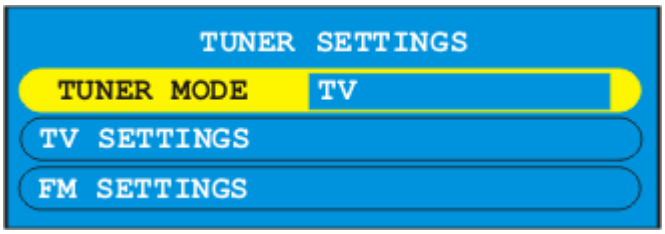
Brightness -- Adjusts the brightness of the picture.
Contrast -- Adjusts the contrast of the picture.
Color -- Adjusts color saturation (0 corresponds to grayscale picture).
Startup Logo -- Enables/Disables "logo" picture display after TVP-500F is on.
Timer Logo -- Sets time (in seconds) for which the logo will be displayed after the TVP-500 is on.
Video Position -- Opens the "Video position" submenu, allowing control of picture size and position on screen.

7.6 Audio Settings

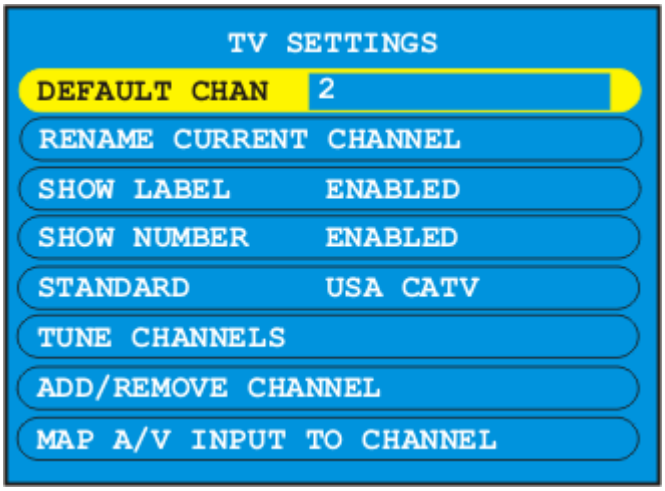


Volume -- Adjusts Volume level
Spatial Effect -- Specifies the strength of 3D-spatial effect

7.7 Tuner Settings (North America)



Tuner Mode -- Selects between TV and FM
TV Settings -- Advances to the TV Settings Menu for additional features.
FM Settings -- Advances to the FM Settings Menu for additional features.



Default Chan -- Specifies the default channel, which will be selected upon TVP-500F power-up. If this default channel is set to "0" -- the default channel will be the last channel selected before the TVP-500F was powered off.

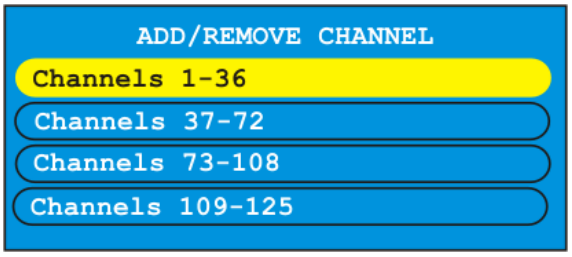
Rename Current Channel
-- Change the text label assigned to the current channel. This label is shown (if enabled) on screen, along with the channel number, when the TVP-500F is switched to this channel. Display of labels and channel numbers can be globally disabled on enabled, see the subsequent menu options.

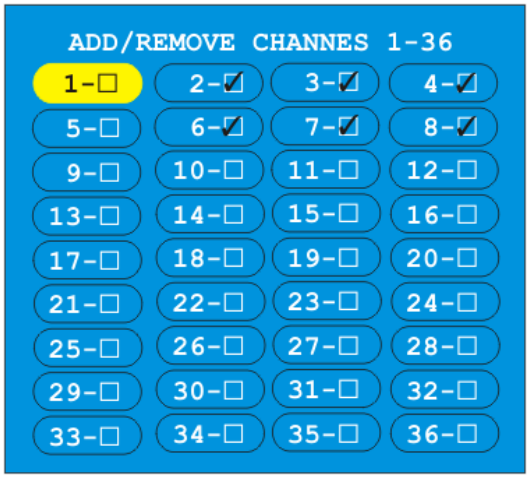
Show Label -- Setting to enable will show up to an 8 character label specific to the channel when changing channels.

Show Number -- Setting to enable will show up the channel number when changing channels.

Standard -- Select tuner mode (channels allocation) to use, among broadcast and several cable options.

Tune Channels -- Scans for valid signal presence and "remembers" which channels are valid and which are not. Note that before this operation TVP-500F must be connected to RF-antenna or cable TV.





Add/Remove Channels -- Allows user to add or remove channels (edit the "validity mask") manually.

Map A/V Input to Channel -- Allows user to make an association between a channel number and the AV inputs.

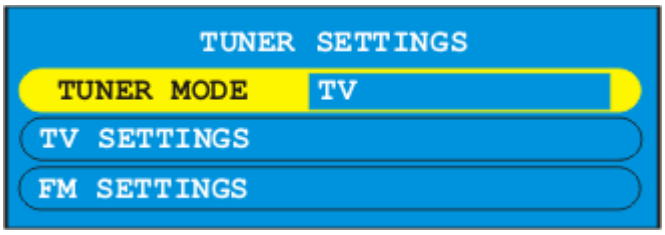
Since the TVP-500F allows to attach several additional video signal sources to its AV inputs, to facilitate user selection of these inputs TVP-500F maps some additional "channel numbers" to its AV inputs. So when these "channels" are selected, the TVP-500F switches to the respective AV input. These reserved channel numbers are based on the values selected in the service menu and could be setup in many different ways as shown below.

26 - Composite video IN (Default is 126)
97 - S-Video IN (Default is 127)
108 - RGB+HV IN (Default is 128)
2 - YPbPr IN (Default is 129)

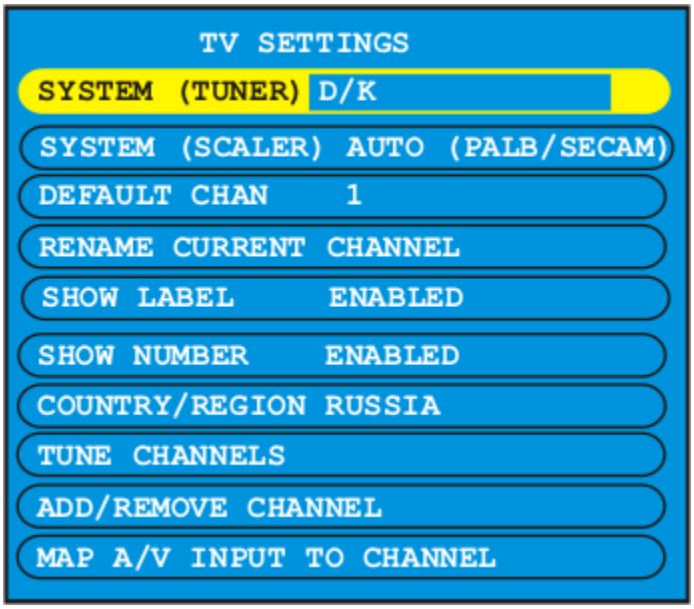
When switching to those channels, the appropriate input will be selected and displayed instead of the normal TV channel.

Note that RGB and YPbPr inputs actually share the same connection, so channels 128 and 129 change only interpretation of this input.

7.8 Tuner Settings (International)

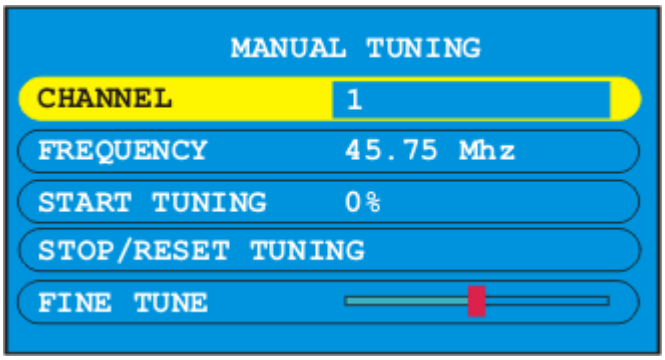


Tuner Mode -- Selects between TV and FM
TV Settings -- Advances to the TV Settings Menu for additional features.
FM Settings -- Advances to the FM Settings Menu for additional features.

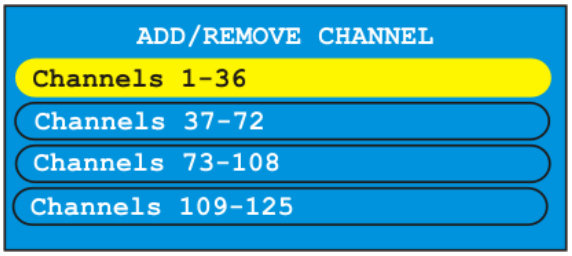


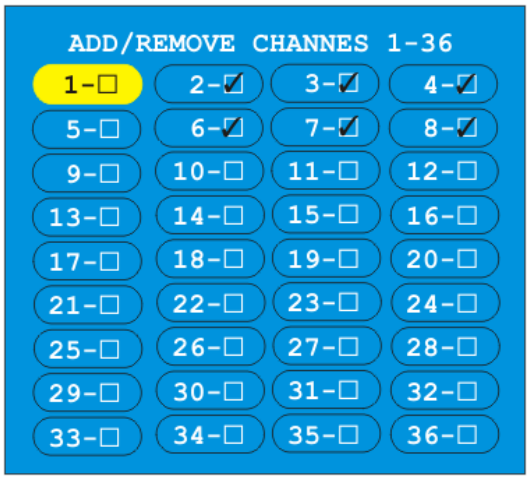
Default Chan -- Specifies the default channel, which will be selected upon TVP-500F power-up. If this default channel is set to "0" -- the default channel will be the last channel selected before the TVP-500F was powered off.
System (Scaler) -- Allows selection signal standards. PAL B/G, PAL D/K, SECAM, PAL M, PAL N, and Auto are among the selections.

Rename Current Channel
-- Change the text label assigned to the current channel. This label is shown (if enabled) on screen, along with the channel number, when the TVP-500F is switched to this channel. Display of labels and channel numbers can be globally disabled on enabled, see the subsequent menu options.
Show Label -- Setting to enable will show up to an 8 character label specific to the channel when changing channels.
Show Number -- Setting to enable will show up the channel number when changing channels.
Country/Region -- Select the region that is or is closest to the type of TV standards used in your region.



Tune Channels (Manual Tuning) -- Scans for valid signal presence and "remembers" which channels are valid and which are not. Note that before this operation TVP-500F must be connected to RF-antenna or cable TV.





Add/Remove Channels -- Allows user to add or remove channels (edit the "validity mask") manually.

Map A/V Input to Channel -- Allows user to make an association between a channel number and the AV inputs.

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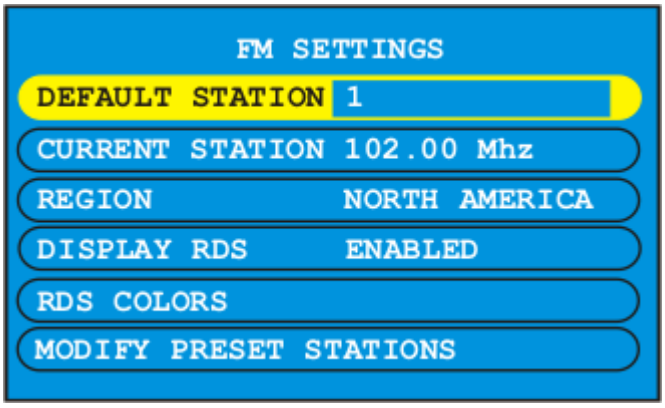
108 - RGB+HV IN (Default is 128)
2 - YPbPr IN (Default is 129)

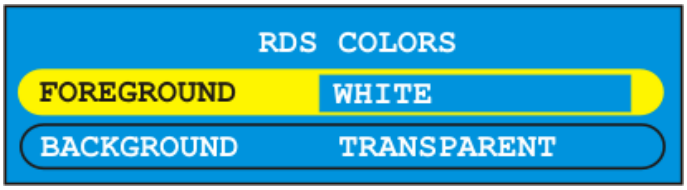
When switching to those channels, the appropriate input will be selected and displayed instead of the normal TV channel.

Note that RGB and YPbPr inputs actually share the same connection, so channels 128 and 129 change only interpretation of this input.

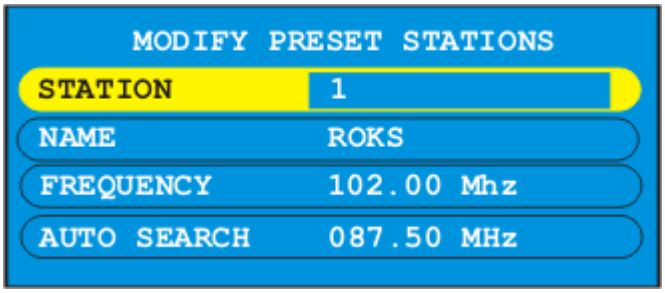
7.9 FM Radio Settings



Default Station -- Specifies the default preset which will be selected upon TVP-500F power-up.
Current Station -- Shows the current radio station tuned by the TVP-500F.
Region -- Sets the area of the world which the TVP-500F is to be used for proper decoding of signal.
Display RDS -- Enables/Disable Radio Display Services for a station if available.



RDS Colors -- Selects the color scheme for the RDS information.



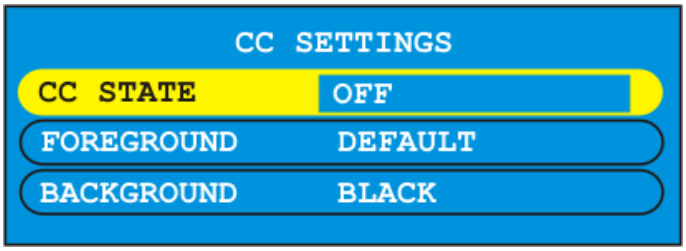
Station -- Sets Preset Station number (1 to 12).
Name -- Labels Preset Station.
Frequency -- Sets Preset frequency.
Auto Search -- Searches for valid FM stations.

There are two ways to set Preset Stations for FM using Modify Preset Stations:
1 – Directly enter the frequency. Then set Preset number and name this Preset Station.

2 – Use Auto Search: press ‘Up/Down’ arrow to select Auto Search. Press ‘Select’ to start. Searching will stop once a station is detected. If it is a desired station, set Preset number and name for this Preset. Press ‘Select’ again to start searching for the next available station.

7.10 CC Settings

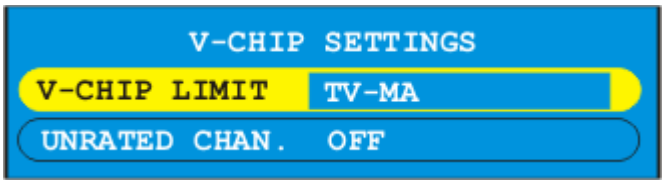
This menu controls Closed Caption decoder – CC signal type, and CC text color.



CC State -- Enables/Disables Closed Captioned.
Foreground -- Sets foreground color for CC text.
Background -- Set background color for CC text.

7.11 V-Chip Settings

This menu configures V-Chip parental control system.



V-Chip Limit -- Sets the threshold for program content indicator. Content rated as set in this option (and below) can be viewed using the TV. Content rated above the setting is rejected (red screen with message is shown).
Unrated Chan. -- Enables/Disables the viewing of “unrated” channels. Off=Do not allow viewing.

*- A user cannot change or reset password. Instead, to change the V-Chip limit user must enter the V-Chip password.

If the password is reset, the user is prompted to enter new password on his/her first access to V-Chip limit. For all subsequent accesses the user will have to use the password that was specified during the first access. In the event the password is forgotten the V-Chip settings can reset by holding the enter button for 5 sec. When prompted for the password enter right, left, right, left, enter and it will be reset to default values.

8 Troubleshooting

Symptom	*Checks*
Key on remote is pressed but nothing happens	See if the upper LED of TVP-500F is fast-blinking while pressing any key and aiming remote at IR sensor on Plasma Display. If it is not -– check the batteries in the remote. Make sure the remote is in TVP mode (by pressing TVP button on the upper left corner of the remote). After existing the Main Menu, make sure there is a 3 to 5 seconds delay before any IR is sent out.
No RS-232 communication	Check baud rate is set to 9600. Cable may need to be nulled.
RDS Info does not display	Poor reception will cause dropped characters from the RDS. Also, not all stations broadcast RDS.
Cannot switch to a particular TV channel using channel +/- browse keys.	The channel is selectable by browsing keys only if it is marked as “valid”. To be marked as “valid” the channel must have a good TV signal during the “Tune Channel” operation. Repeat the Tune Channel (making sure aerial/cable connection is good). Also the channel validity can be edited manually.

The two LEDs located on the TVP-500F indicate the current state of TVP-500F and may be useful for troubleshooting.
During the startup (after powering on) the LEDs blink as the unit goes through self-test procedures and firmware booting. If, after connecting the power, LEDs do not show any activity, then probably there are problems with the power supply.
If the LEDs blink in alternative pattern -- upper/lower/upper/lower/etc – then the bootblock is active and no valid main firmware is detected or it’s somehow corrupted. This can happen if, for instance, the preceding firmware update procedure was aborted for some reason. The bootblock waits for the new firmware upload, see the “Firmware update” section of this document.

During the normal functioning of TVP-500F (when a valid firmware is loaded and self-test and startup procedures are finished, which takes about 2 seconds), the LED functions are:

Upper LED:

- *Flashes for 50ms once in 6 seconds when TVP-500F is attached to power supply, but is in “Power Off” (“sleep”) state. Flashes for 50ms once in 3 seconds when TVP-500F is in “Power On” state. This activity can be overridden by other activities of the same LED.*
- *Blinks fast when IR signal are detected. This can be used to see whether TVP-500F receives any IR control packets or not. This does not mean that TVP-500F recognizes any IR command.*

Lower LED:

- *Switches ON when a control packet is sent through the RS-232. Switched OFF when a valid reply to the control packet is received back. Therefore, if this LED is ON for a long time, probably there are problems with the Panel Connection (or Panel power supply).*

The upper LED has also another purpose – if the TVP-500F encounters an internal irrecoverable error, it stops all activities and starts blinking the upper LED in series (series of blinks, then a longer delay, then the series of blinks is repeated, so on).

9 Firmware and Startup Picture update

The internal software of TVP-500F (the firmware) can be updated. This may be necessary to fix errors in previous releases of the firmware, or to enhance functionality. The similar procedure is used to update the "logo picture" that can be shown by TVP-500F for a predefined time after power on.
For the update procedure the serial port of the TVP-500F must be connected to the RS-232 ("COM") port of a PC-compatible personal computer, running MS-Windows 98, 2k, or XP operating system.

Update procedure

1. Connect the Plasma to a PC using a 9pin-to-9pin RS232 cable.
2. Use the AXLdr.Exe utility to upload firmware or logo picture. This utility is a Win32 command line (console) application. It can be run from within any application that allows specifying command line (the simplest example is Windows Start\Run dialog). The command line syntax is:

   `AXLdr.Exe <port_number> <filename>`

   where
   - `<port_number>` is a COM port number to which the TVP-500F is connected (1-based, that is, for COM1 this number is 1).
   - `<filename>` is the path and name of the file to be uploaded. Must be either *.BMP file (bitmap) or *.ATF (TVP-500F firmware) file.

   Example command line to load new bitmap file or to update the Firmware:

```
C:\TVP500F\AXLdr.Exe 1 logo1.bmp
C:\TVP500F\AXLdr.Exe 1 TVP500F.ATF
```

In this case, COM1 port is used to upload the new logo (logo1.bmp) or the new FW (TVP500F). After the successful update, the TVP-500F firmware will restart automatically.

Note: to upload a file or a newer Firmware to TVP-500F, the loader (AXLdr.exe) and the file must be stored in the same directory.

If the loaded firmware image is not valid (its header or checksum do not match the expected), this firmware will not be loaded upon startup. Instead, the unit will remain in bootblock, which will wait for the new firmware image to be uploaded again. This is indicated by LEDs "alternate" blinking low/high/low/etc.

File format for logo picture BMP file

AXLdr.Exe supports conversion and loading of standard 24-bit unpacked RGB MS *.BMP files. The recommended picture size is 852x480 pixels (width is 852 pixels, height is 480 pixels). Only one picture can be uploaded and used as logo.

10 RS-232 Protocol

Baud Rate: 9600 8N1

? IS A QUERY COMMAND	(Does not have to be Case Sensitive)
! IS A COMMAND	(Does not have to be Case Sensitive)
~ IS A RESPONSE	(ALL RESPONSES ARE CAPITALS)

<CR> is 0D hex or 13 decimal

!KEY_LEFT<CR>	Left
!KEY_RIGHT<CR>	Right
!KEY_UP<CR>	Up arrow key
!KEY_DOWN<CR>	Down arrow key
!KEY_SEL<CR>	Select
!KEY_CH-<CR>	Channel Down
!KEY_CH+<CR>	`Channel Up
!KEY_LAST<CR>	Toggles between the last 2 channels selected
!KEY_0<CR>	0
!KEY_1<CR>	1
!KEY_2<CR>	2
!KEY_3<CR>	3
!KEY_4<CR>	4
!KEY_5<CR>	5
!KEY_6<CR>	6
!KEY_7<CR>	7
!KEY_8<CR>	8
!KEY_9<CR>	9
!KEY_SET<CR>	Set button for presets
!KEY_P1<CR>	Preset 1
!KEY_P2<CR>	Preset 2
!KEY_P3<CR>	Preset 3
!KEY_P4<CR>	Preset 4
!KEY_P5<CR>	Preset 5
!KEY_P6<CR>	Preset 6
!KEY_P7<CR>	Preset 7
!KEY_P8<CR>	Preset 8
!KEY_P9<CR>	Preset 9
!KEY_P10<CR>	Preset 10
!KEY_P11<CR>	Preset 11
!KEY_P12<CR>	Preset 12
!KEY_MUTE<CR>	Volume mute
!KEY_TV<CR>	TV Source Selection
!KEY_FM<CR>	FM Source Selection
!KEY_VID<CR>	Video Source Selection
!KEY_SVID<CR>	S-Video Source Selection
!KEY_RGB<CR>	RGB/YPbPr Source Selection
!KEY_MENU<CR>	MENU
!KEY_INFO<CR>	Info
!KEY_CC<CR>	Closed Captioning
!KEY_EDS<CR>	Extended Data Services

!KEY_RED<CR>	Teletext Red Key
!KEY_GREEN<CR>	Teletext Green Key
!KEY_YELLOW<CR>	Teletext Yellow Key
!KEY_BLUE<CR>	Teletext Blue Key
!KEY_TTX_ONOFF<CR>	Teletext On/Off toggle Key
!KEY_TRANSPARENT<CR>	Teletext Transparent Key
?MCH<CR>	Query Main Channel Responds with ~MCH002<CR> for channel 2.
!MCHxxx<CR>	Main TV Channel change !MCH025<CR> for channel 25. xxx = 001 to 125
?MIN<CR>	Main Input Query responds with ~MTV<CR> or ~MFM<CR>
!FCHxxxx<CR>	FM Channel Selection. !FCH0987<CR> for 98.7fm.
?FCH<CR>	Query FM Channel responds with ~FCH0987<CR> for 98.7fm.
?VER<CR>	Version Query responds with ~VER 1.00<CR> if version 1.00 was present.
!CC1<CR>	Closed Caption 1 selection
!CC2<CR>	Closed Caption 2 selection
!CCOFF<CR>	Closed Caption Off selection
?CC<CR>	Query Closed Caption responds with either ~CC1<CR>, ~CC2<CR>, ~CCOFF<CR>
?AFC<CR>	responds with ~AFCxx<CR> xx=2 digit ASCII decimal equivalent

Bit 7 - AFCWIN 1 = inside AFC Window 0 = Outside AFC Window
Bit 6 - VIFL 1 = Video IF Level High 0 = Video IF Level Low
Bit 5 - FMIFL 1 = fm IF Level High 0 = fm IF Level Low
Bits D4-D1 (AFC4-AFC1) Read the 4 bits separate of the other bits for easy use. eg. (afc & 0x1E) then shift the bits 1 place to the right. This will give you a value of 0x00 to 0x0F. Follow the chart below to determine the signal.

Bit4	Bit3	Bit2	Bit1	
0	1	1	1	-187.5kHz
0	1	1	0	-162.5kHz
0	1	0	1	-137.5kHz
0	1	0	0	-112.5kHz
0	0	1	1	-87.5kHz
0	0	1	0	-62.5kHz
0	0	0	1	-37.5kHz
0	0	0	0	-12.5kHz
1	1	1	1	+12.5kHz
1	1	1	0	+37.5kHz
1	1	0	1	+62.5kHz
1	1	0	0	+87.5kHz
1	0	1	1	+112.5kHz
1	0	1	0	+137.5kHz
1	0	0	1	+162.5kHz
1	0	0	0	+187.5kHz

Bit 0 -PONR 1 = Power on reset after supply breakdown 0 = After a successful reading of the status register

!LOGOON<CR>	Enable Logo /Bitmap
!LOGOOFF<CR>	Disable Logo / Bitmap
!LOGOTIMER%%<CR>	Set Logo display time when unit is first turned on

?LOGOSTATUS<CR>	Reports back the logo status
?LOGOTIMER<CR>	Current logo timeout
!CxxxFxxxxx<CR>	TV Channel Frequency setup for International version.
!C002F05525<CR>	Set channel 2 to a freq of 55.25MHz.

General Info
Unless otherwise noted all valid commands are echoed back if properly received unless the "***" address is used.
When Main TV or FM channel is changed via remote or contact closure, the RS232 is updated by sending a ~MCHxxx<CR> or ~FCHxxxx<CR> response as long as the address is zero.
When Volume is changed via remote or contact closure, the RS232 is updated by sending a ~VOLxx<CR> response
Invalid commands will reply with ~ERROR<CR> as long as the address is zero.

Convert the multi-digit ASCII decimal representation response to a true hexadecimal value. Ex. xx = 13 (0x31, 0x33) turn this into 0D. The bit information is once the ASCII to hexadecimal conversion has been done.

11 Specifications

11.1 Applicable signals

Output format:

- NTSC system (RF and AV inputs): RGB-HV 525p (480p)
- PAL/SECAM system (RF and AV inputs): RGB-HV 576p

Inputs:

- RF Tuner (North America - NTCS) and FM
  Receiving RF signals – US Standard Air, US Standard Cable, Cable HRC, Cable IRC
  TV Frequency Range: 55.25 to 801.25 MHz, 31.25 or 62.5KHz fine tune
  FM Frequency Range: 76.00 to 108.00 MHz, 50KHz fine tune

- RF Tuner (International – PAL/SECAM) and FM
  TV Frequency Range: 48.25 to 855.25 MHz, 31.25/50.0, or 62.5KHz fine tune
  FM Frequency Range: 76.00 to 108.00 MHz, 50KHz fine tune

- Composite Video
  Impedance: 75 ohms
  Typical Input Level: 1.0V peak-peak into 75 ohms

- S-Video
  Impedance: 75 ohms
  Typical Input Level: 1.0v peak-peak into 75 ohms

- RGB-HV/YPbPr
  Supported resolutions:
  RGB-HV: VGA 60Hz, SVGA 60Hz, and XGA 60Hz
  YPbPr: 480i, 480p (NTSC system) or 576i, 576p (PAL/SECAM system)

- Supported audio standards: auto-detection, BTSC-STEREO, BTSC-MONO+SAP

11.2 Connection terminals

- Composite Video IN (RCA)
- S Video IN (4 pin Mini - DIN)
- RGB+HV / YPbPr IN – 15-pin female VGA-compatible connector.
- TV (aerial) IN – RF UHF/VHF (F Type connector for NTSC and IEC for PAL/SECAM)
- FM (aerial) IN – RF (F type connector for NTSC and IEC for PAL/SECAM)
- HDMI IN
- Audio stereo IN (RCA)

11.3 Dimensions

Height x Depth x Length: 1.09” x 5.45’ x 11.87’

11.4 Weight

Approximately .55 lbs for TVP-500F unit and 1.5 lbs with all accessories and box

12 Limited Lifetime Warranty

Aurora Multimedia Corp. (“Manufacturer”) warrants that this product is free of defects in both materials and workmanship for the product lifetime as defined herein for parts and labor from date of purchase. This Limited Lifetime warranty covers products purchased in the year of 2003 and after. Product lifetime is defined as 7 years from discontinuance of product. Motorized mechanical parts (Hard Drives, DVD, etc), remotes and cables are covered for a period of 1 year. Supplied batteries are not covered by this warranty. During the warranty period, and upon proof of purchase, the product will be repaired or replaced (with same or similar model) at our option without charge for parts or labor for the specified product lifetime warranty period.

This warranty shall not apply if any of the following:
A) The product has been damaged by negligence, accident, lightning, water, act-of-God or mishandling; or,
B) The product has not been operated in accordance with procedures specified in operating instructions: or,
C) The product has been repaired and or altered by other than manufacturer or authorized service center; or,
D) The product's original serial number has been modified or removed: or,
E) External equipment other than supplied by manufacturer, in determination of manufacturer, shall have affected the performance, safety or reliability of the product.
F) Part(s) are no longer available for product.

In the event that the product needs repair or replacement during the specified warranty period, product should be shipped back to Manufacturer at Purchaser's expense. Repaired or replaced product shall be returned to Purchaser by standard shipping methods at Manufacturer's discretion. Express shipping will be at the expense of the Purchaser. If Purchaser resides outside the contiguous US, return shipping shall be at Purchaser's expense.

No other warranty, express or implied other than Manufacturer's shall apply.

Manufacturer does not assume any responsibility for consequential damages, expenses or loss of revenue or property, inconvenience or interruption in operation experienced by the customer due to a malfunction of the purchased equipment. No warranty service performed on any product shall extend the applicable warranty period.

This warranty does not cover damage to the equipment during shipping and Manufacturer assumes no responsibility for such damage.

This product warranty extends to the original purchaser only and will be null and void upon any assignment or transfer.

13 FCC Part 15 Statement

RADIO AND TELEVISION INTERFERENCE
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

You may also find helpful the following booklet, prepared by the FCC: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington D.C. 20402.
Changes and Modifications not expressly approved by the manufacturer or registrant of this equipment can void your authority to operate this equipment under Federal Communications Commissions rules.
In order to maintain compliance with FCC regulations shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio & television re